



Prospective Overthinking Mitigation: Hyperheuristics to Facilitate System 1.5

 Details



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Abstract:

For certain AI-related combinatorial optimization problems, Hyperheuristics (HH) may have higher Energy Efficiency (EE) and results efficacy than that of a Metacognitive Module (MCM). For these cases, HH tend to excel in the strategy selection solution space (as contrasted to the parameter-tuning solution space). In particular, HH have shown some promise in the Large Reasoning Model (LRM) arena, where MCM have been beset by the paradigm of overthinking and analysis paralysis. This paradigm is not necessarily aligned with the need for heightened EE and effectiveness in the AI arena, and a performance paradox is illuminated for a number of cases (i.e., wherein more tokens actually segues to poorer performance). Given this counterintuitive System 2 dilemma conjoined with less robust contextual reasoning for System 1, there might be a useful intermediary state in the form of a System 1.5 (to serve as mitigation against overthinking) so as to advance the state of LRMs. Widely acknowledged NP-hard and NP-complete Combinatorial Optimization Problems (COPs) were selected, and HH as well as MCM were benchmarked. It turns out that the moniker of System 1.5 may be apropos, as the HH seem to provide some value-added propositions from both System 1 and 2.

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